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A LOW-COST WATER SEAL FUMIGATOR

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The fumigator described here was originally developed for use in fumigating small lots of cotton samples infested by the pink bollworm (Pectinophora gossypiella (Saund.)). More recently it has been used for treating other commodities, such as vetch seed and string beans, for fumigation data, and its performance has been satisfactory. Both carbon disulfide and methyl bromide have been used in this fumigator. A number of fumigators have been built and used by various investigators.

Construction

The container is constructed from a 50-gallon oil drum; the top is removed by cutting around the rim and then smoothing the rough edges.

The water jacket or collar (figs. 1 and 2) which surrounds the upper part of the drum is made of 20-gauge galvanized iron. A $\frac{1}{2}$ " flat fold is made on the edge designated as the top of the collar. The ends are brought together, overlapping $\frac{3}{4}$ ", and then riveted and soldered. The rivet heads are placed on the outside of the jacket to provide a smooth surface within. The bottom of the collar is then crimped, placed in position, and soldered to the drum.

The cover (figs. 1 and 3) is also constructed of 20-gauge galvanized iron. The piece forming the rim should fit loosely around the drum inside the jacket, and the ends are brought together and fastened by loose laps. The bottom of the rim is crimped inward in order to strengthen that portion. A $\frac{1}{8}$ " right-angle flange facing outward is made at the top of the rim.

The top part of the cover is a disc made of 20-gauge galvanized iron, with a $\frac{3}{16}$ " loose fold formed around the perimeter, in which the right-angle flange on the rim is fitted. All seams are then rolled and thoroughly soldered.

A 2" tubulature of 20-gauge galvanized iron is made with a lap joint on the side and flanged at the bottom. This is fitted

into an appropriate opening in the center of the cover and soldered. It is flared slightly at the top to accommodate a rubber stopper of the proper size.

The handles are made of 24-gauge galvanized iron. The pieces are folded on the sides, bent into shape, riveted to the cover, and soldered to prevent leakage.

The evaporating pan (figs. 1 and 4) is made of 22-gauge galvanized iron about $10\frac{1}{2}$ " square and 1" deep. Stove bolts $2\frac{1}{2}$ " long by $3/16$ " in diameter are used to fasten the pan to the inside of the cover. Holes are first made near each corner of the pan through which the stove bolts are fitted and soldered, the bolt heads being under the pan. Holes are then made in the cover through which the bolts can pass. Before fitting the evaporating pan to the cover, single nuts are run down to a distance of 2" from the bottom of the pan. The bolts are then passed through the holes in the cover and securely fastened by outside nuts, which are then soldered in place to prevent leakage.

Operation

In order to operate the fumigator, water is introduced into the jacket until it is about three-fourths full. The cover is then placed in the jacket and permitted to settle to its resting position. In order to test for leakage the cover is raised an inch or two, and when in that position the stopper is inserted. If no leaks occur the cover will remain in the same position indefinitely except for movement caused by expansion or contraction of the gas within the drum. In using this apparatus for fumigating, the load is placed inside the drum, the cover is applied, and the fumigant is poured through the tubulated opening into the pan beneath. During the vaporization of the fumigant the added gas pressure within will cause the cover to rise. This apparatus makes a tight and effective fumigation chamber for small quantities of material.

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WATER SEAL DRUM FUMIGATOR.

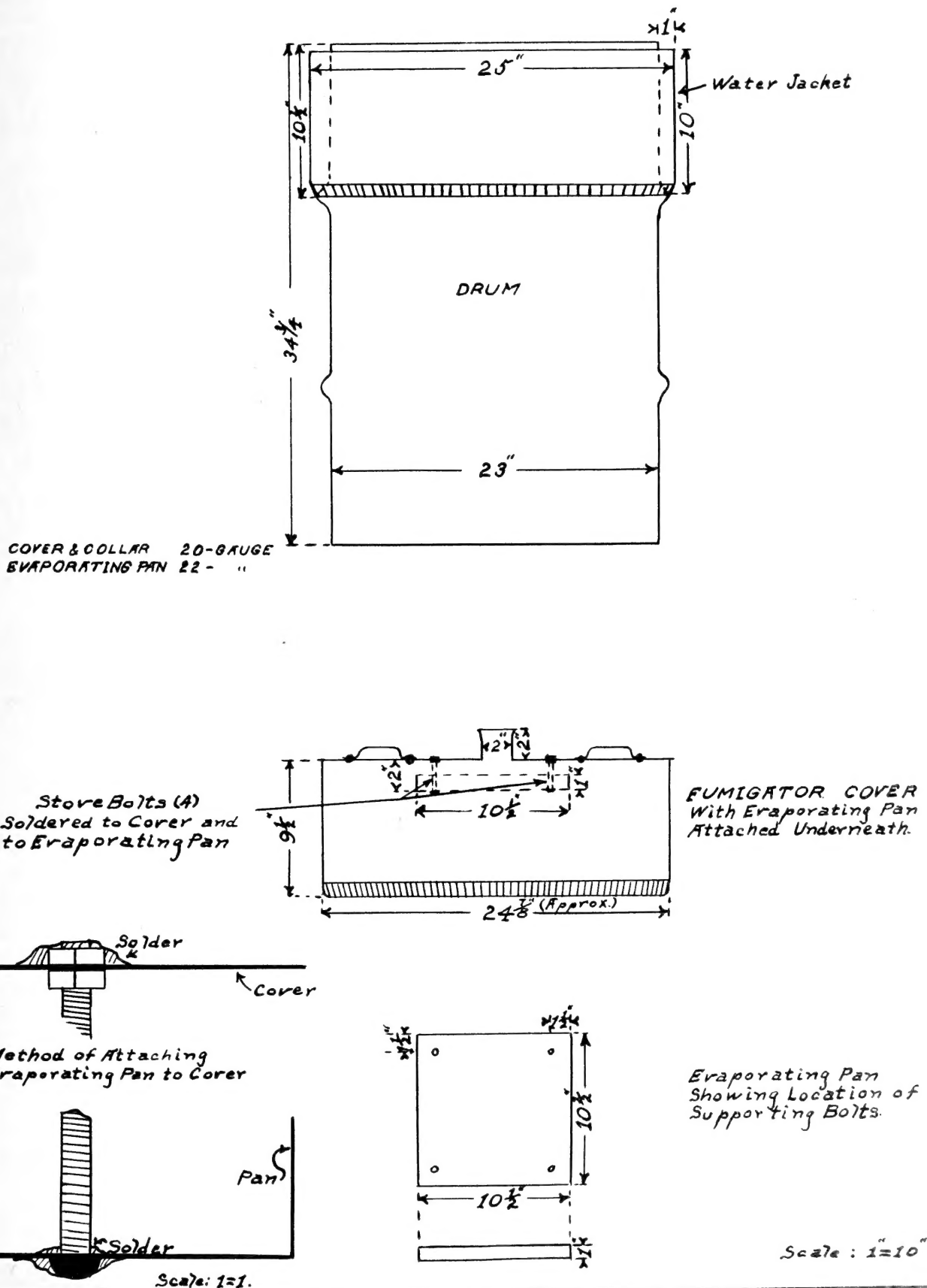


Figure 1.—Details of the water seal drum fumigator.

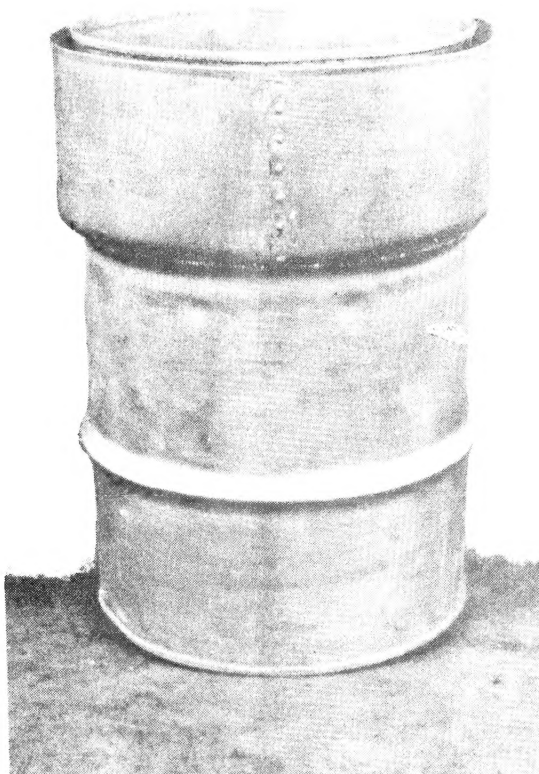


Figure 2.--Fumigation drum showing water jacket attached.

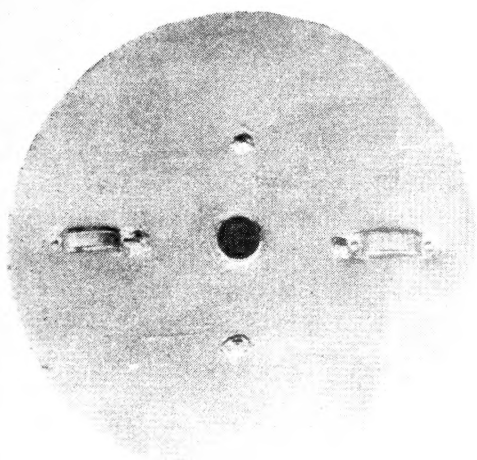


Figure 3.--Top of cover showing handles and opening for introducing fumigant.

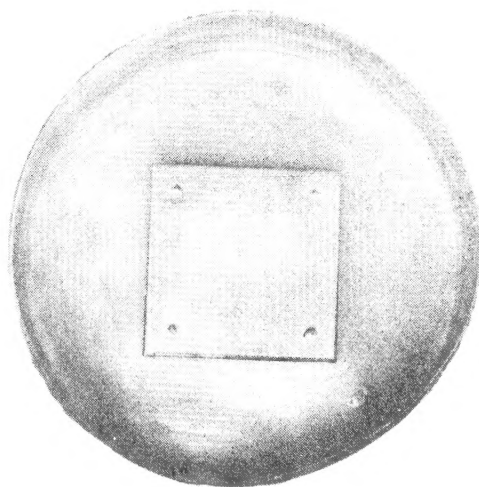


Figure 4.--Under side of cover showing evaporating pan.

